

Borehole

50-11-10**Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-111</u>	Site Number : <u>299-W10-153</u>
N-Coord : <u>43,369</u>	W-Coord : <u>75,789</u>	TOC Elevation : <u>672.00</u>
Water Level, ft : <u>89.3</u>	Date Drilled : <u>1/31/1975</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

Cement Bottom, ft. : 100 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-11-10 was drilled in January 1975 to a depth of 100 ft. A 6-in. casing was installed from the ground surface to total depth. In July and August 1980, the 6-in. casing was perforated from 0 to 20 ft and 98 to 100 ft and a 4-in. casing was installed. The annular space between the two casings was filled with grout. The casing wall thickness is assumed to be 0.237 in. for the 4-in. casing and 0.280 in. for the 6-in. casing.

The tops of both casings are approximately even with the ground surface. The top of casing, which is the zero reference for the SGLS, is at an elevation of 672.0 ft.

Equipment Information

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>01/14/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>7.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>01/15/1998</u>	Logging Engineer: <u>Gary Lekvold</u>
Start Depth, ft.: <u>97.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>57.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>3</u>	Log Run Date :	<u>01/16/1998</u>	Logging Engineer:	<u>Jim Coates</u>
Start Depth, ft.:	<u>55.5</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>14.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>msa</u>

Log Run Number :	<u>4</u>	Log Run Date :	<u>01/19/1998</u>	Logging Engineer:	<u>Jim Coates</u>
Start Depth, ft.:	<u>15.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>6.5</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

The borehole was logged in four runs on January 14, 15, 16, and 19, 1998. The total logging depth achieved by the SGLS was 97.0 ft. Spectra were collected at intervals of 0.5 ft, using a 200-s count time at each interval

At the time of logging, there was a small amount of water in the borehole. The depth to water inside the casing was measured at 90.4 ft.

Analysis Information

Analyst : R.G. McCainData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 05/26/1998**Analysis Notes :**

The pre-survey and post-survey field verification measurements met acceptance criteria established for peak shape and system efficiency. Energy and resolution calibrations from appropriate verification spectra were used to establish the channel-to-energy conversion and peak resolution parameters used in processing the spectra acquired during the logging operation.

Peak spreading associated with the relatively thick double casing and annular grout was encountered, and many lines associated with naturally occurring radionuclides were poorly defined. Also, the peak recognition software frequently indicated false peaks in the tails of significant peaks, particularly the K-40 peak at 1460.8 keV, the 1764.5-keV peak associated with the U-238 decay chain, and the 2614.6-keV peak associated with the Th-232 decay chain. These peaks were manually deleted.

A casing correction factor for 0.50-in.-thick steel casing was used to determine concentration data over the entire depth. This factor most closely matches the combined thickness of the 4-in. and 6-in. casings. Concentrations are lower than actual because there is no allowance for the effects of the annular grout between casings. A grout correction was not made because none is available.

Log Plot Notes:

Separate plots show the man-made and naturally occurring radionuclides. Concentrations are shown as apparent concentrations to reflect the uncertainty associated with the dual casing and annular grout. The headings of the plots identify the specific gamma lines used to calculate concentrations. Uncertainty bars in the plots show statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plot indicate the MDL, which represents the lowest concentration at which positive identification of a

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gamma-ray peak is statistically defensible.

A combination plot includes man-made and natural radionuclides, the total gamma count rate derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma log plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Results/Interpretations:

The radionuclide concentrations identified are only apparent concentrations and should be considered underestimated.

The man-made radionuclides Cs-137 and Co-60 were detected around this borehole. Cs-137 contamination was detected in the upper 2.5 ft at concentrations ranging from 0.19 to 0.24 pCi/g. Traces of Co-60 contamination were detected at 68 and 69 ft at concentrations of 0.06 and 0.08 pCi/g, respectively. In both cases, only the 1332-keV peak was detected; no confirming peak was found at 1173 keV. Therefore, the presence of Co-60 contamination at levels above the MDL is uncertain.

The K-40 concentrations show a slight increase associated with the contact between the backfill and undisturbed Hanford formation sediments at 38 ft. U-238 and Th-232 concentrations fluctuate about 0.5 pCi/g over most of the borehole.